



## Total Maximum Daily Load Information Sheet

### Gravois Creek

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#### Water Body Segment at a Glance:

<b>County:</b>	St. Louis City/St. Louis
<b>Nearby Cities:</b>	within St. Louis
<b>Length of segment:</b>	
<b>Water Body ID 1712:</b>	2.0 miles
<b>Pollutant:</b>	Bacteria, Chloride
<b>Source:</b>	Urban Nonpoint Sources
<b>Length of segment:</b>	
<b>Water Body ID 1713:</b>	4.0 miles
<b>Pollutants:</b>	Bacteria, Chloride and Low Dissolved Oxygen
<b>Source:</b>	Urban Nonpoint Sources



State Map Showing Location of Watershed

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**Scheduled for TMDL development:** 2011 for bacteria and chloride; 2014 for low DO

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#### Description of the Problem

##### Beneficial uses of Gravois Creek

- Livestock and Wildlife Watering
- Protection of Warm Water Aquatic Life
- Protection of Human Health (Fish Consumption)
- Whole Body Contact Recreation – Category B

##### Uses that are impaired

- Protection of Warm Water Aquatic Life (chloride and low dissolved oxygen)
- Whole Body Contact Recreation – Category B (bacteria)

##### Standards that apply

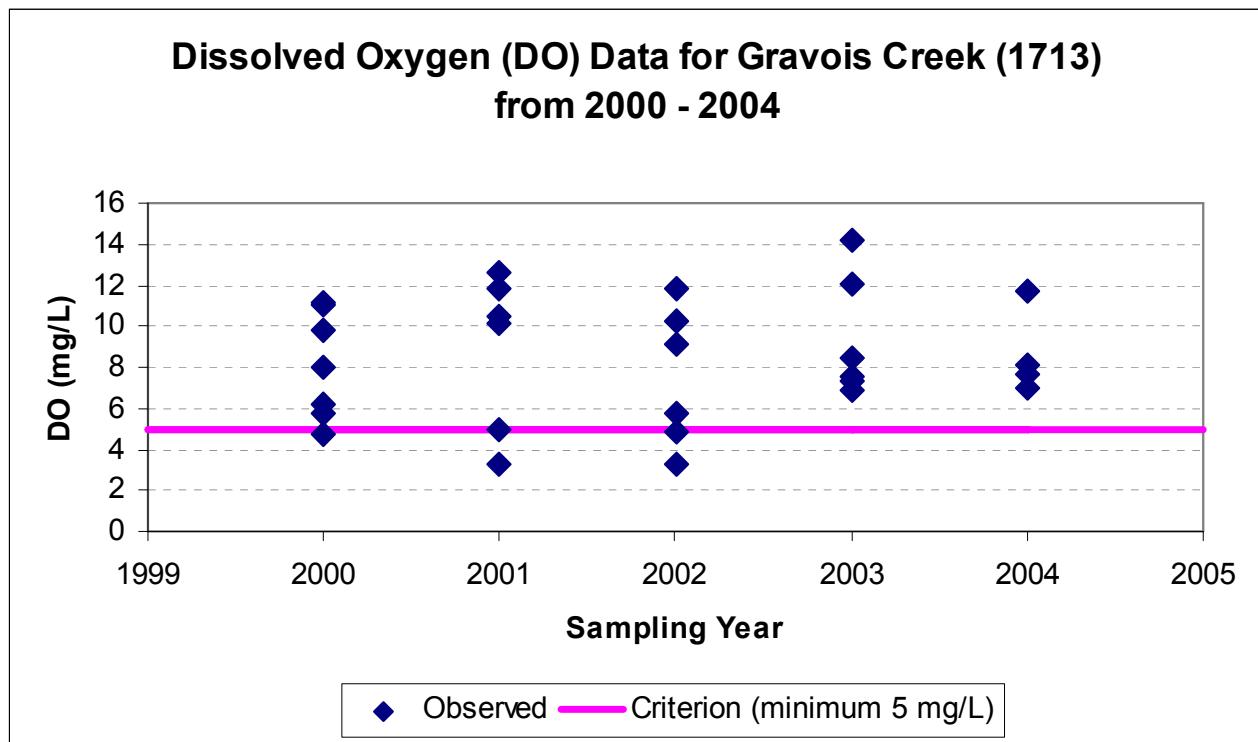
- Missouri's Water Quality Standards at 10 CSR 20-7.031(4)(C) state that the *E.coli* bacteria count shall not exceed 126 colonies per 100 milliliters of water (126 col/100 mL) for Category A and 206 col/100 mL for Category B. This count is the geometric mean during the recreational season (April 1- October 31) in waters designated for whole body contact recreation.
- The criteria for chloride are found in 10 CSR 20-7.031 Table A. The chronic criterion is 230 milligrams per liter (mg/L or parts per million) and the acute criterion is 860 mg/L.
- Also in Table A, the criterion for dissolved oxygen in streams is a minimum of 5 mg/L.

### Background information and water quality data

Gravois Creek is a tributary to River des Peres in St. Louis, Missouri. Evidence for the impairments comes from data collected by the U.S. Geological Survey from 2000-2004. All data was from near the downstream end of WBID 1713 (see map on page 5) and was therefore judged to be representative of bacterial and chloride quality in both segments. Because dissolved oxygen can be more variable, dissolved oxygen data from 1713 was not judged to be representative of 1712 (the downstream segment).

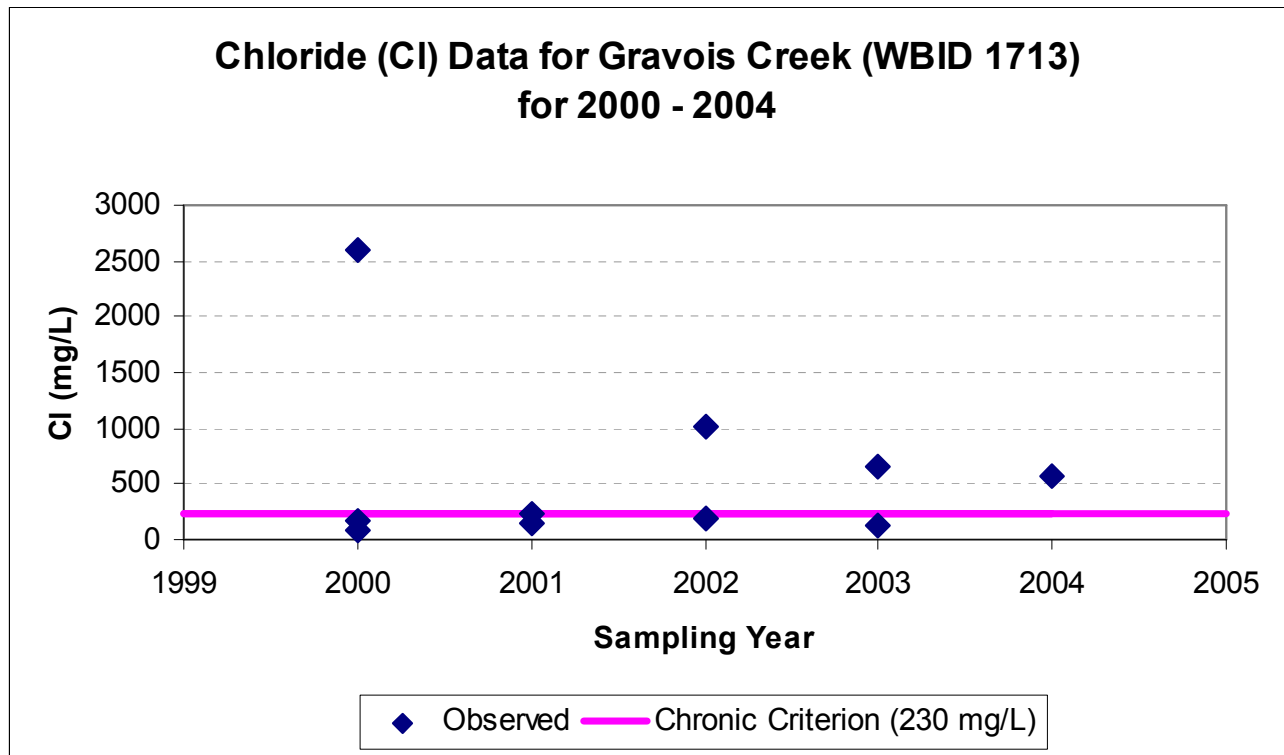
### Dissolved Oxygen

Water quality conditions in Gravois Creek are not protective of aquatic life. Dissolved oxygen is important as many aquatic organisms require high levels of oxygen to survive. For dissolved oxygen, if more than 10 percent of measurements in a water body fail to meet the water quality criterion that water body is judged to be impaired. In the case of Gravois Creek, four of 29 samples (13.8 percent) did not meet the water quality criterion (Figure 1).



### Chloride

The Listing Methodology stipulates that only one exceedence of the chloride criteria in the last three years of available data is necessary to constitute an impairment. The USGS data contain three samples where the chronic standard of 230 mg/L is exceeded in Coldwater Creek in last three years of available data, 2004, 2003 and 2002 (Figure 2).



**Figure 2**

### Bacteria

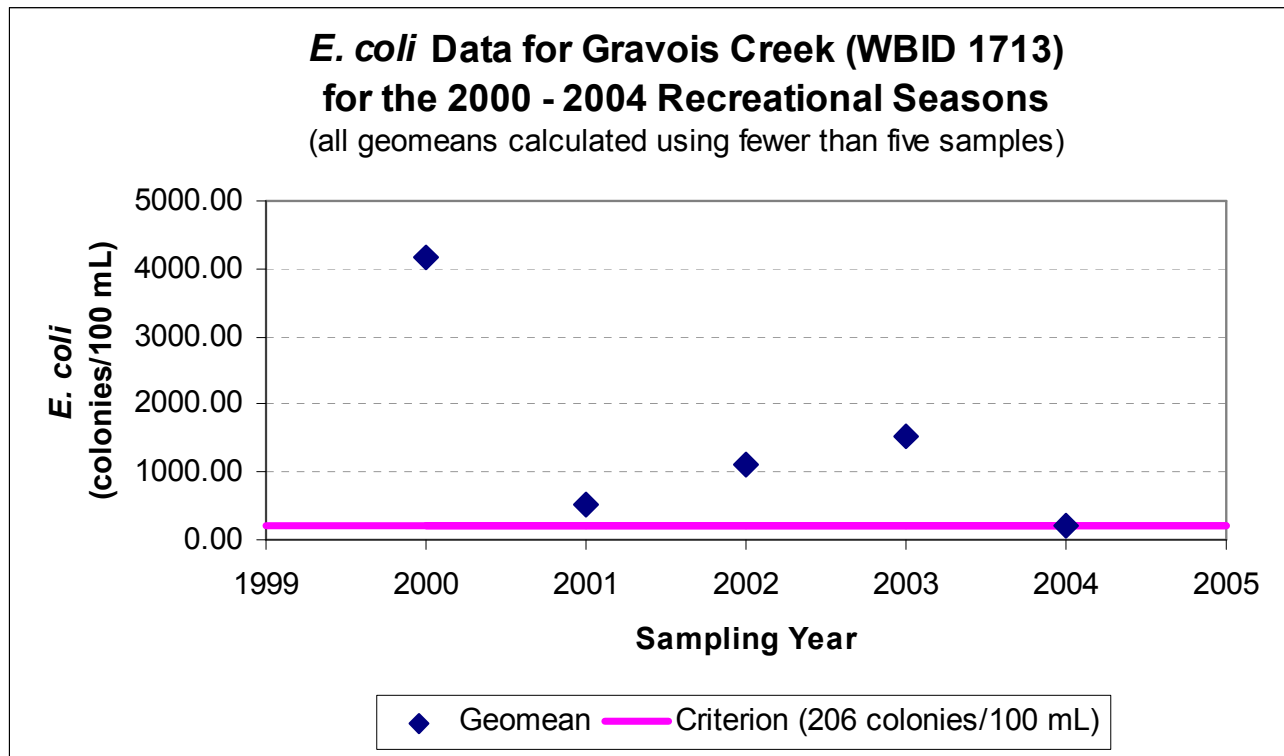
Excessive amounts of fecal bacteria in surface water used for recreation are an indication of an increased risk of pathogen-induced illness to humans. Infections due to pathogen-contaminated waters include gastrointestinal, respiratory, eye, ear, nose, throat and skin diseases. *E. coli*, are bacteria found in the intestines of warm blooded animals and are used as indicators of the risk of waterborne disease from pathogenic (disease causing) bacteria or viruses. Most *E. coli* strains are harmless, but some can cause serious illness in humans and are occasionally responsible for product recalls. The harmless strains are part of the normal flora of the intestines, and can benefit their hosts by preventing the establishment of pathogenic bacteria within the intestine<sup>1,2</sup>. Missouri's bacteria criteria are based on specific levels of risk of acute gastrointestinal illness. The levels of risk correlating to these criteria are no more than eight illnesses per 1,000 swimmers in fresh water.

Gravois Creek is designated as Category B for the whole body contact recreation use, which means it has places deep enough for total immersion (i.e., swimming), but they may be on private lands or inaccessible to the public. The Listing Methodology for bacteria states that if the annual average (geometric mean) for at least one of the last three years of available data exceeds the criteria, the stream is judged to be impaired. In Gravois Creek, the geometric mean of the USGS bacteria data exceeded the criterion of 206 col/100 mL for Category B each year from 2000-03 (Figure 3).

<sup>1</sup> Hudault S, Guignot J, Servin AL (July 2001). "[Escherichia coli strains colonising the gastrointestinal tract protect germfree mice against Salmonella typhimurium infection](#)". *Gut* **49** (1): 47–55

<sup>2</sup> Reid G, Howard J, Gan BS (September 2001). "Can bacterial interference prevent infection?". *Trends Microbiol.* **9** (9): 424–8.

However, five samples are needed to calculate a geometric mean to determine compliance with the standards and none of years had as many as five samples. More data need to be gathered.



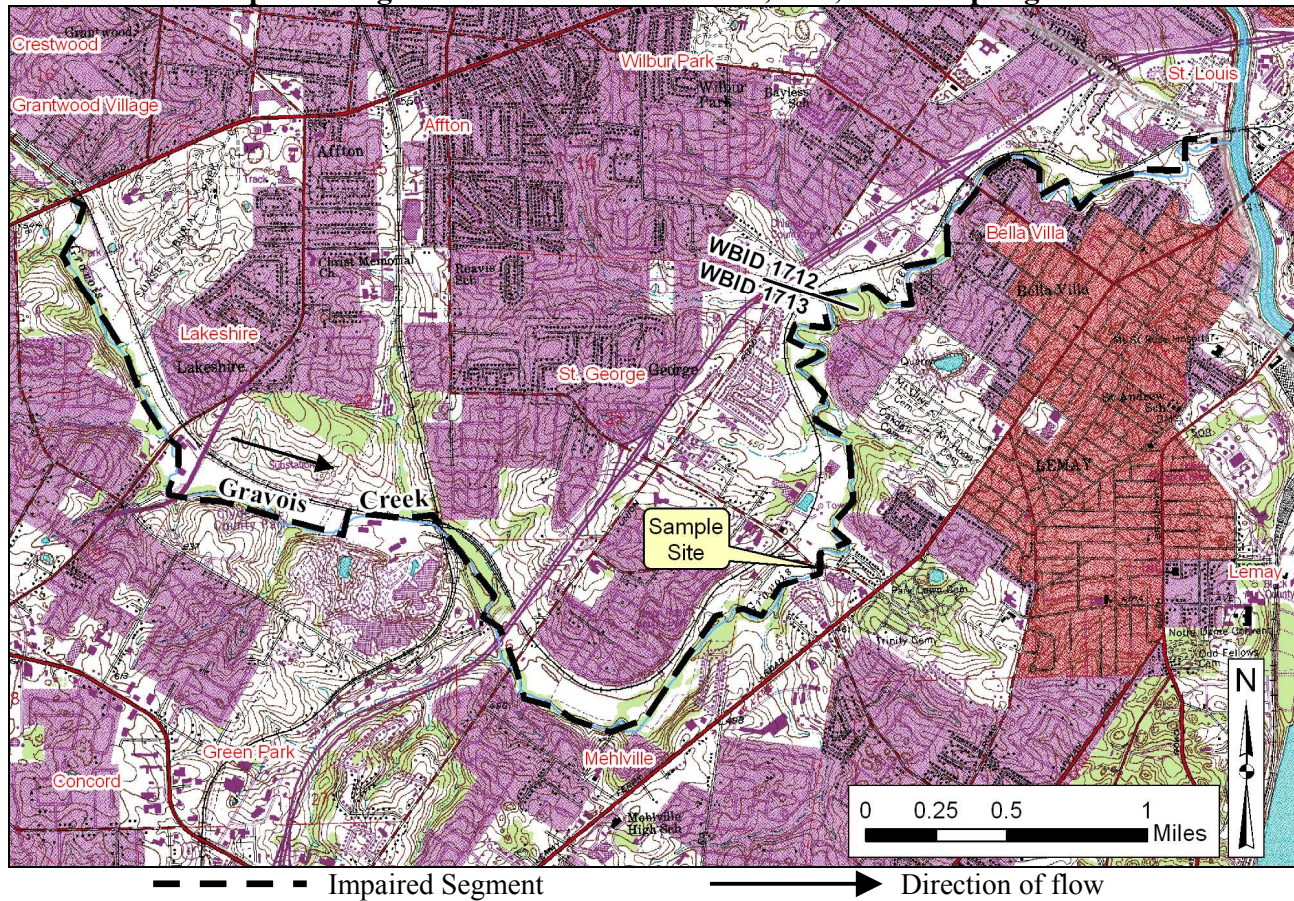
**Figure 3**

People can protect themselves from waterborne illness by avoiding contact with contaminated water. However, when swimming anywhere, it is wise to take common sense precautions. These include washing hands before eating, showering after swimming and avoiding exposure to questionable water if you have open cuts or wounds.

A map of Gravois Creek may be found on the next page.



## Map Showing Gravois Creek in St. Louis, Mo., and Sampling Site



**Sample Site**  
Gravois Creek at Green Park Road

### For more information call or write:

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Water Protection Program

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